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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/529,007

03/24/2005

Amir Khajepour

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10/23/2006

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EXAMINER

BUDD, MARK OSBORNE

ART UNIT

PAPER NUMBER

2834

DATE MAILED: 10/23/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/529,007

Applicant(s)

KHAJEPOUR ET AL.

Examiner

Mark Budd

Art Unit

2834

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 5-12 and 16-20 is/are allowed.
- 6) ☒ Claim(s) 1-4, 13-15 and 21-24 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 24 March 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. ____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 3-24-05 and 12-16-05.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. ____.
- ☐ Notice of Informal Patent Application
- ☐ Other: ____.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claim 1-4, 12-15 and 21-24 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential elements, such omission amounting to a gap between the elements. See MPEP § 2172.01. The omitted elements are: at least two more actuators. All of the described and illustrated embodiments showed that a minimum of three actuators are required in order to provide an inchworm actuator. There is no written or illustrated disclosure of a device that can produce continuous movement with less than three actuators.

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 21-23 are rejected under 35 USC 102 (b) as being anticipated by Takahashi. Noting for example, figure 1, Takahashi teaches a frame #3, #27, a piezoelectric actuator stack #13 a movable portion of the device #35 and a hydraulic rooster which is defined by the hydraulic amplifier, #25, #29. The different surface areas at #25 a and #29 allows the device to achieve mechanical amplification of the movement of the piezoelectric stack.

Art Unit: 2834

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims for and 24 are rejected under 35 USC 103 (a) as being unpatentable over Takahashi. Takahashi, as noted above, teaches the combination of a piezoelectric actuator and a hydraulic amplifier. Takahashi uses the hydraulic amplifier to increase the physical displacement of the piezoelectric stack. As is well known, the amplifier works both ways. That is to say, a small displacement to the large area creates a large displacement at the small area and vice versa. Reversing the amplifier (near rearrangement of parts) would have been obvious to what of ordinary skill in the art depending on the result desired. For example, smaller increments of displacement could be achieved by reversing the amplifier. Thus, a finer control of displacement would be obtained. Also, placing the piezoelectric element at the small side of the amplifier (less mechanical resistance) means a lower input (drive) voltage could be used.

Claims 13-15 are rejected under 35 USC 103 (a) as being unpatentable over O'Neill in view of Takahashi. O'Neill, in figure 4, teaches an inchworm actuator directly driving a valve needle #32. The actuator consists of a frame and multiple piezoelectric elements #10. Clamps #24, #26 are provided on each end of the movable member. O'Neill does not provide a fluid amplifier between the piezoelectric driver and the valve needle. However, as noted above, Takahashi teaches providing a fluid coupling between a piezoelectric actuator and a driven needle valve in order to achieve larger displacement. Thus, for at least this reason it would have been obvious to one of ordinary skill in the art to provide a fluid amplifier between the driver and needle valve of O'Neill.

Claims 5-12 and 16-20 are allowed.

Further cited of interest or Blanding, Klug and Kipke.


Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mark Budd whose telephone number is 571-272-2019.

The examiner can normally be reached on Monday-Thursday from 6 a.m. to 4 p.m.

Art Unit: 2834

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Karen Schuberg, can be reached on 571-272-2044. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


Mark Budd
Primary Examiner
Art Unit 2834